

AMENDMENTS TO THE CLAIMS:

Please amend claims 1, 2, 5, 7, 10-12, 21, 49-51, 56-57, 60, 65-66, 68, 70-76, and 79, cancel claims 3, 4, 13-17, 23-48, 53-55, 58, 59, 61-64, 83, 86-88, 91, 92, and 94-97 without prejudice or disclaimer thereto, add claims 98-109, and amend the claims as follows:

What is claimed is:

1. (Currently Amended) A frame transfer method in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising ~~the steps~~ of:

adding, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination to make an expansion frame; and
relaying said data frame based on said forwarding information of said added expansion tag to transfer the frame to said egress node by each node on said network.

2. (Currently Amended) A frame transfer method in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising ~~the steps~~ of:

adding, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination and information about customers to which said source and said destination belong to make an expansion frame; and
relaying said data frame based on said forwarding information of said added expansion tag to transfer the frame to said egress node by each node on said network.

3.-4. (Cancelled)

5. (Currently Amended) The frame transfer method in the network as set forth in claim 1, wherein, at an ingress node of the source of said data frame on said network, said expansion tag is generated based on network information of said data frame and said generated said expansion tag is added to make said expansion frame.
6. (Original) The frame transfer method in the network as set forth in claim 1, wherein at said egress node on said network, said expansion tag is deleted from said expansion frame to make said data frame and said data frame is transferred to said transfer destination.
7. (Currently Amended) The frame transfer method in the network as set forth in claim 1, wherein said data frame comprises ~~is~~ an Ethernet frame.
8. (Original) The frame transfer method in the network as set forth in claim 6, wherein a VLAN tag of said Ethernet frame is replaced by said expansion tag to make said expansion frame.
9. (Original) The frame transfer method in the network as set forth in claim 7, wherein said expansion tag is inserted immediately after a source MAC address of said Ethernet frame to make said expansion frame.
10. (Currently Amended) The frame transfer method in the network as set forth in claim 7, wherein, when said Ethernet frame fails to have said VLAN tag, said expansion tag is

added between a source MAC address and Ethernet attribute information to make said expansion frame.

11. (Currently Amended) The frame transfer method in the network as set forth in claim 1, wherein said forwarding information comprises ~~is~~ identification information comprising ~~composed of~~ identifier information of said egress node or label information for reaching said egress node.

12. (Currently Amended) The frame transfer method in the network as set forth in claim 1, wherein said forwarding information comprises ~~is~~ identification information comprising ~~composed of~~ identifier information of said egress node or label information for reaching said egress node and additionally identifier information of said ingress node.

13.-17. (Cancelled)

18. (Original) The frame transfer method in the network as set forth in claim 1, wherein a length of said expansion tag is 32 bits and a length of a storage region of said expansion tag is an integral multiple of 32 bits.

19. (Original) The frame transfer method in the network as set forth in claim 1, wherein said ingress node in said network has a table which makes an address of said transfer destination and identification information of said egress node correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other, and

said egress node has a table which makes an address of said transfer destination and output port information correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other.

20. (Original) The frame transfer method in the network as set forth in claim 1, wherein

said ingress node in said network has a table which makes an address of said transfer destination and identification information of said egress node correspond with each other, a table which makes identification information of said egress node and output port information correspond with each other, and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other, and

said egress node has a table which makes an address of said transfer destination and output port information correspond with each other, a table which makes identification information of said egress node and output port information correspond with each other and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other.

21. (Currently Amended) The frame transfer method in the network as set forth in claim 20, wherein identification information of said ingress node comprises ~~is an~~ existing VLAN tag value or a group identifier obtained by grouping a part of existing VLAN tags or a group identifier obtained by grouping all the existing VLAN tags.

22. (Original) The frame transfer method in the network as set forth in claim 1, wherein
said ingress node in said network has a table which makes an address of said transfer destination, identification information of said egress node and customer information of said transfer destination correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other,
a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other, and
said egress node has a table which makes customer information of said transfer destination and output port information correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other.

23.- 48. (Cancelled)

49. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a frame processing element which adds, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination to make an expansion frame;³⁵ and

a switch element which receives said expansion frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

50. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a frame processing element which adds, to said data frame, an expansion tag containing information about forwarding of an ingress node which has received said frame to make an expansion frame, when applied said data frame is a frame to be broadcast;³⁵ and

a switch element which receives said expansion frame to transfer the frame to a path to each node on said network based on said forwarding information of said expansion tag.

51. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a frame processing element which adds, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination and customer information of said destination to make an expansion frame;³⁵ and

a switch element which receives said expansion frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

52.-55. (Cancelled)

56. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a switch element which receives an expansion frame with an expansion tag including information about forwarding to an egress edge node to said destination to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

57. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a switch element which receives an expansion frame with an expansion tag including forwarding information of an ingress edge node which has received said frame to transfer the frame to a path to each node on said network based on said forwarding information of said expansion tag.

58.-59. (Cancelled)

60. (Currently Amended) A node in a network for transferring a data frame sent from a source on the network to a predetermined destination, comprising:

a switch element which receives an expansion frame with an expansion tag including information about forwarding to an egress edge node to said destination and customer information of said destination to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

61.-64. (Cancelled)

65. (Currently Amended) The node as set forth in claim 49, wherein said frame processing element comprises: including,

a frame attribute detector for extracting frame attribute information of applied said data frame to an input port of the node;

an expansion tag generator for generating said expansion tag based on said frame attribute information; and

a frame converter for adding said generated said expansion tag to applied said data frame to convert the frame into an expansion frame.

66. (Currently Amended) The node as set forth in claim 65, wherein

said expansion tag generator includes:

a correspondence information table in which information about correspondence between frame attribute information generated by said frame attribute detector and network information; and

an expansion tag generation unit for, after reading network information corresponding to said frame attribute information from said correspondence information table based on said frame attribute information, generating an expansion tag based on said network information.

67. (Original) The node as set forth in claim 65, wherein said frame converter, when a data frame applied to an input port of said node is an Ethernet frame, inserts said expansion tag after said destination MAC address.

68. (Currently Amended) The node as set forth in claim 65, wherein said frame converter comprises includes:

an expansion tag separation unit for, when said data frame is an Ethernet frame, separating said expansion tag from said expansion frame transferred from said frame switch;
and

a frame check sequence ~~an FCS~~ calculation unit for recalculating a frame check sequence ~~an FCS~~ of said Ethernet frame transferred from the expansion tag separation unit to rewrite the frame check sequence ~~FCS~~.

69. (Original) The node as set forth in claim 49, further comprising an expansion tag deletion circuit for deleting said expansion tag included in said frame with an expansion tag to output the frame as a data frame.

70. (Currently Amended) The node as set forth in claim 69, wherein said expansion tag deletion circuit comprises includes:

an expansion tag separation unit for separating said expansion tag from said expansion frame;
and

an FCS calculation unit for recalculating an FCS of said Ethernet frame transferred from the expansion tag separation unit to rewrite the FCS.

71. (Currently Amended) The node as set forth in claim 49, wherein said switch element comprises: including,

a frame forwarding unit for receiving an expansion frame transferred from said frame processing element to obtain output port information based on network information stored in an expansion tag in said expansion frame; and

a packet switch unit for receiving an expansion frame and said output port information transferred from said frame forwarding unit to output said frame with an expansion tag to a port as set forth in said output port information.

72. (Currently Amended) The node as set forth in claim 71, wherein

said frame forwarding unit comprises~~includes~~:

an expansion tag information table indicative of correspondence between forwarding information in an expansion tag of said expansion frame received and output port information of said packet switch; and

a forwarding path search unit for extracting forwarding information from an expansion tag of said expansion frame received and referring to said expansion tag information table to obtain output port information from the forwarding information.

73. (Currently Amended) The node as set forth in claim 72, wherein said forwarding information comprises~~is~~ identification information composed of identifier information of said egress node or label information for reaching said egress node.

74. (Currently Amended) The node as set forth in claim 72, wherein said forwarding information comprises ~~is~~ identification information composed of identifier information of said egress node or label information for reaching said egress node and additionally identifier information of said ingress node.

75. (Currently Amended) The node as set forth in claim 72, wherein said forwarding information comprises ~~is~~ identification information comprising ~~composed of~~ identifier information of said ingress node.

76. (Currently Amended) The node as set forth in claim 72, wherein said forwarding information comprises ~~is~~ identification information comprising ~~composed of~~ identifier information of said egress node and identifier information of a domain in each hierarchy to which the node belongs or label information for reaching said egress node.

77. (Original) The node as set forth in claim 49, wherein
said ingress node in said network has a table which makes an address of said transfer destination and identification information of said egress node correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other, and

said egress node has a table which makes an address of said transfer destination and output port information correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other.

78. (Original) The node as set forth in claim 49, wherein

said ingress node in said network has a table which makes an address of said transfer destination and identification information of said egress node correspond with each other, a table which makes identification information of said egress node and output port information correspond with each other, and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other, and

said egress node has a table which makes an address of said transfer destination and output port information correspond with each other, a table which makes identification information of said egress node and output port information correspond with each other and a table which makes identification information of said ingress node and one or a plurality of output port information correspond with each other.

79. (Currently Amended) The node as set forth in claim 49, wherein identification information of said ingress node comprises ~~is an~~ existing VLAN tag value or a group

identifier obtained by grouping a part of existing VLAN tags or a group identifier obtained by grouping all the existing VLAN tags.

80. (Original) The node as set forth in claim 49, wherein

said ingress node in said network has a table which makes an address of said transfer destination, identification information of said egress node and customer information of said transfer destination correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node and output port information correspond with each other, and

said egress node has a table which makes customer information of said transfer destination and output port information correspond with each other and a table which makes identification information of said egress node and output port information correspond with each other.

81. (Original) The node as set forth in claim 49, wherein

said ingress node in said network has a table which makes an address of said transfer destination, identification information of said egress node and identification information of a domain in each hierarchy to which the node belongs correspond with each other, and a table which makes identification information of said egress node, identification information of a domain in each hierarchy to which the node belongs and output port information correspond with each other,

a core node in said network has a table which makes identification information of said egress node, identification information of a domain in each hierarchy to which the node belongs and output port information correspond with each other, and

said egress node has a table which makes an address of said transfer destination and output port information correspond with each other, and a table which makes identification information of said egress node, identification information of a domain in each hierarchy to which the node belongs and output port information correspond with each other.

82. (Original) In a network for transferring a data frame sent from a source on the network to a predetermined destination, a frame transfer program executed on a node in the network for controlling transfer of said data frame, comprising the functions of:

adding, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination to make an expansion frame, and

receiving said expansion frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

83. (Cancelled)

84. (Original) In a network for transferring a data frame sent from a source on the network to a predetermined destination, a frame transfer program executed on a node in the network for controlling transfer of said data frame, comprising the functions of:

adding, to applied said data frame, an expansion tag containing information about forwarding to an egress edge node to said destination and customer information of said destination to make an expansion frame, and

receiving said expansion frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

85.-88. (Cancelled)

89. (Original) In a network for transferring a data frame sent from a source on the network to a predetermined destination, a frame transfer program executed on a node in the network for controlling transfer of said data frame, comprising the function of:

receiving an expansion frame with an expansion tag including information about forwarding to an egress edge node to said destination added to applied said data frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

90. (Original) In a network for transferring a data frame sent from a source on the network to a predetermined destination, a frame transfer program executed on a node in the network for controlling transfer of said data frame, comprising the function of:

receiving an expansion frame with an expansion tag including forwarding information of an ingress edge node which has received said frame added to applied said data frame to

transfer the frame to a path to each node on said network based on said forwarding information of said expansion tag.

91. and 92. (Cancelled)

93. (Original) In a network for transferring a data frame sent from a source on the network to a predetermined destination, a frame transfer program executed on a node in the network for controlling transfer of said data frame, comprising the function of:

receiving an expansion frame with an expansion tag including information about forwarding to an egress edge node to said destination and customer information of said destination added to applied said data frame to transfer the frame to a path to said egress node based on said forwarding information of said expansion tag.

94.-97. (Cancelled)

98. (New) A node configured to generate and transfer an Ethernet frame, the Ethernet frame comprising an expansion tag storage region comprising:

a plurality of expansion tags;

an expansion tag information region containing information about a kind of the plurality of expansion tags; and

an expansion tag identification region containing information according to the kind of the plurality of expansion tags.

99. (New) The expansion tag storage region of claim 98, wherein a first expansion tag comprises an identifier of a destination node and a label of a destination.

100. (New) The expansion tag storage region of claim 98, wherein the plurality of expansion tags includes one of a customer separation tag, a protection tag, an operation and management tag, a quality information tag, a frame control tag, a security tag, a user expansion tag, and a broadcast forwarding tag.

101. (New) The expansion tag storage region of claim 98, wherein the expansion tag identification region comprises one or more of:

- a forwarding tag identification bit to indicate if the expansion tag is a forwarding tag of the plurality of expansion tags;

- a region end point indication bit to indicate if the expansion tag is a final expansion tag in the plurality of expansion tags;

- a VLAN/Expansion tag indication bit to identify if the expansion tag is an expansion tag of the plurality of expansion tags;

- a tag type display region to indicate a type of the plurality of expansion tags; and

- a frame control information storage region to store frame control information.

102 (New) The expansion tag identification region of claim 101, further comprising a reservation bit.

103. (New) The expansion tag storage region of claim 98, wherein the expansion tag information region comprises:

- an address type region to store a type of address; and
- an address region to store transfer information of the Ethernet frame.

104. (New) The Ethernet frame of claim 98, further comprising:

- a destination MAC address region to store a destination MAC address;
- a source MAC address region to store a source MAC address;
- an Ethernet attribute information region; and
- an FCS region.

105. (New) A node configured to generate and transfer an Ethernet frame, the Ethernet frame comprising a VLAN tag, the VLAN tag comprising:

- a priority TAG region;
- a TPID region;
- a VLAN identification region;
- an expansion tag information region; and
- an expansion tag identification region.

106. (New) The Ethernet frame of claim 105, comprising an expansion tag region, the expansion tag region comprising a plurality of expansion tags.

107. (New) The expansion tag information region of claim 105, comprising:

an expansion tag information region;
a CFI region; and
a priority region.

108. (New) The Ethernet frame of claim 105, wherein the expansion tag identification region comprises a TPID.

109. (New) The expansion tag storage region of claim 106, wherein the plurality of expansion tags includes at least one of a customer separation tag, a protection tag, an operation and management tag, a quality information tag, a frame control tag, a security tag, a user expansion tag, and a broadcast forwarding tag.